



Applications of AREPS

Current operational uses

- Airborne & surface-based radar probability of detection
- ESM vulnerability
- VHF/UHF communications assessment
- Strike & electronic countermeasures assessment
- Early warning aircraft stationing
- HF ground and sky-wave communication / radar assessment

Future operational uses

- Homeland defense
Border patrol communications
- Satellite communications assessment
- GPS jamming vulnerability
- TBM probability of detection



AREPS Windows® Personal Computer Implementation

METOC in numerous formats

Observations / Mesoscale Models / Climatology



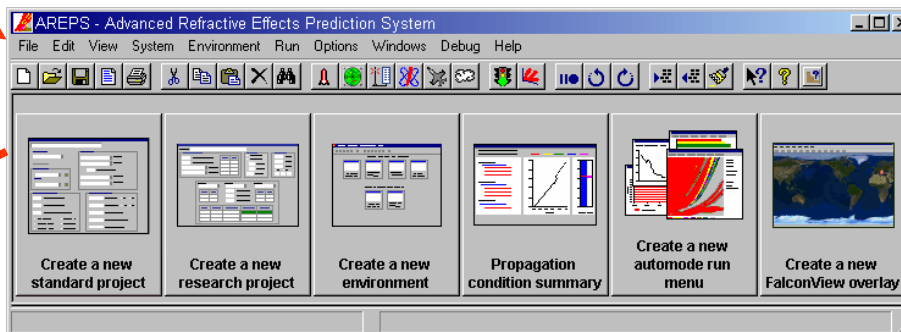
DTED Terrain



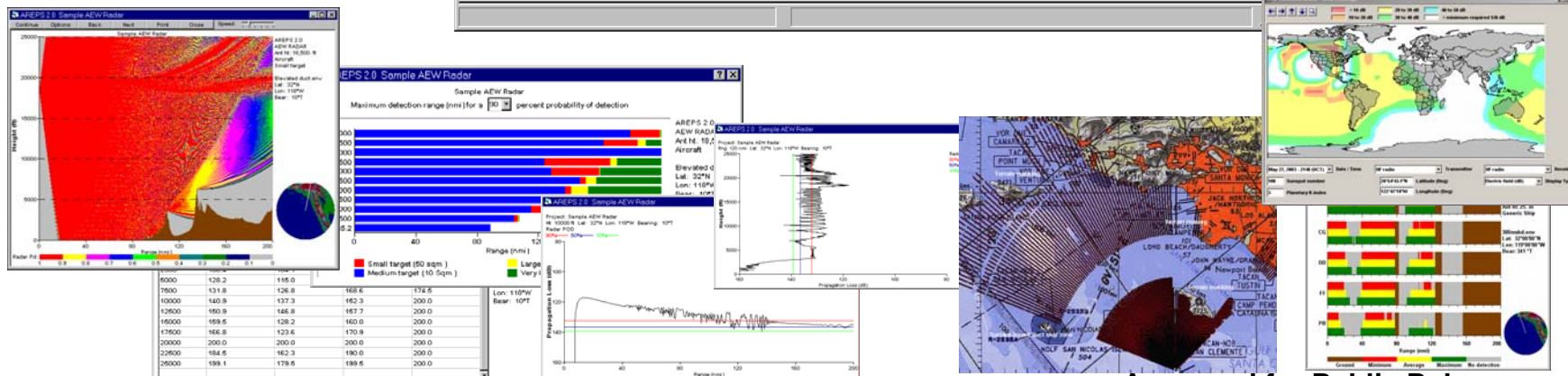
EM systems



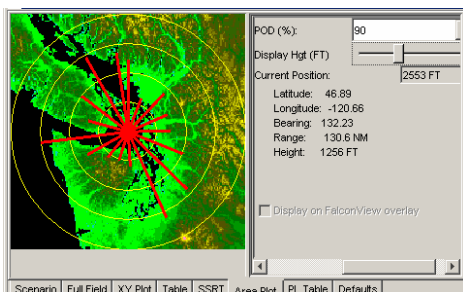
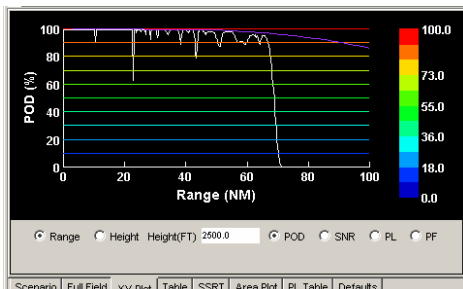
Operator interface



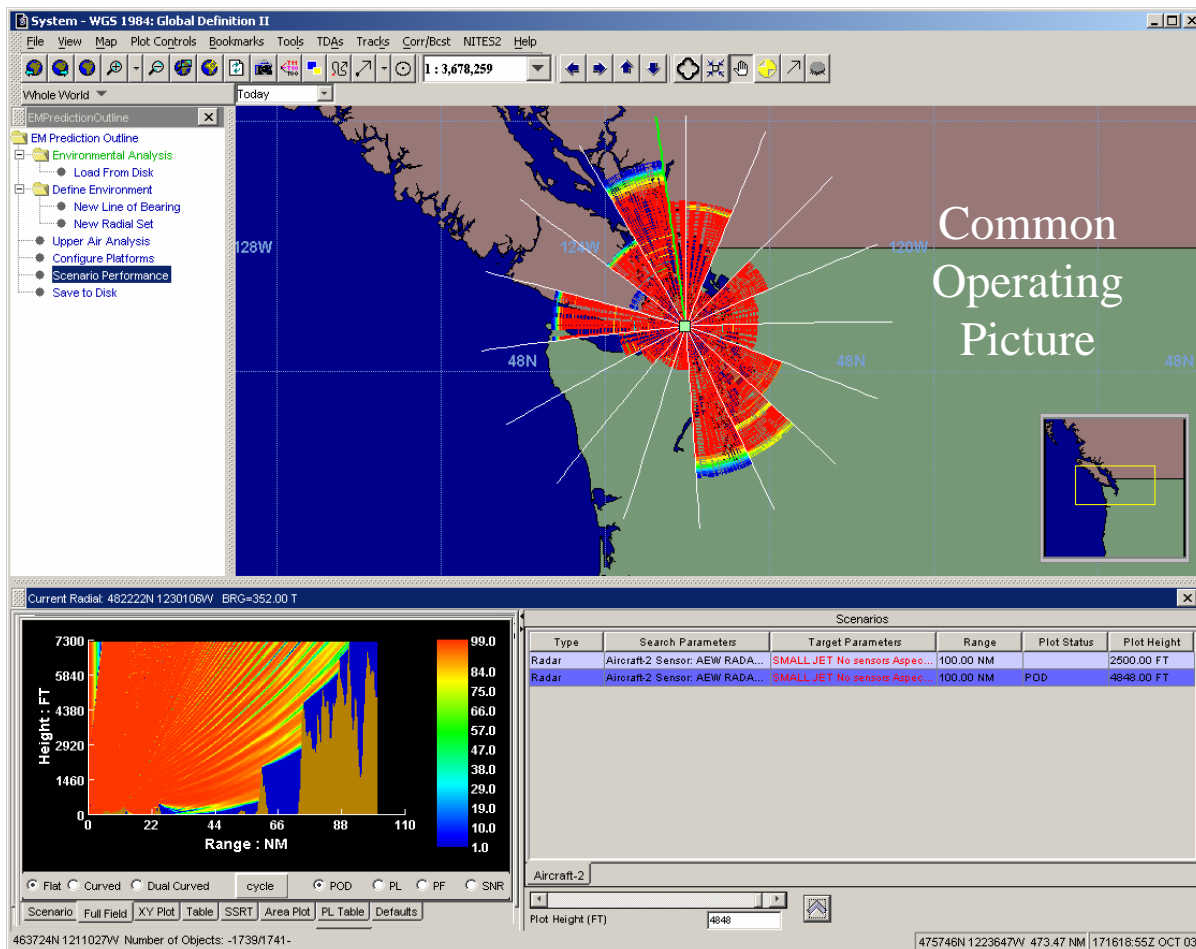
Numerous decision aids



AREPS GCCS-M (NITES-II) Implementation



	1	2	3	4	5	6
	0.2 NM	0.5 NM	0.7 NM	0.9 NM	1.1 NM	
383	7224 FT	120.0	120.7	121.6	122.6	123.7
382	7206 FT	120.0	120.7	121.6	122.6	123.7
381	7187 FT	120.0	120.6	121.6	122.6	123.7
380	7168 FT	119.9	120.6	121.6	122.6	123.6
379	7149 FT	119.9	120.6	121.5	122.6	123.6
378	7130 FT	119.9	120.6	121.5	122.6	123.6
377	7111 FT	119.9	120.6	121.5	122.6	123.6
376	7092 FT	119.8	120.5	121.5	122.5	123.6
375	7074 FT	119.8	120.5	121.5	122.5	123.6
374	7055 FT	119.8	120.5	121.4	122.5	123.6
373	7036 FT	119.8	120.5	121.4	122.5	123.6
372	7017 FT	119.7	120.4	121.4	122.5	123.6
371	6998 FT	119.7	120.4	121.4	122.5	123.5
370	6979 FT	119.7	120.4	121.4	122.5	123.5





AREPS Server Mode

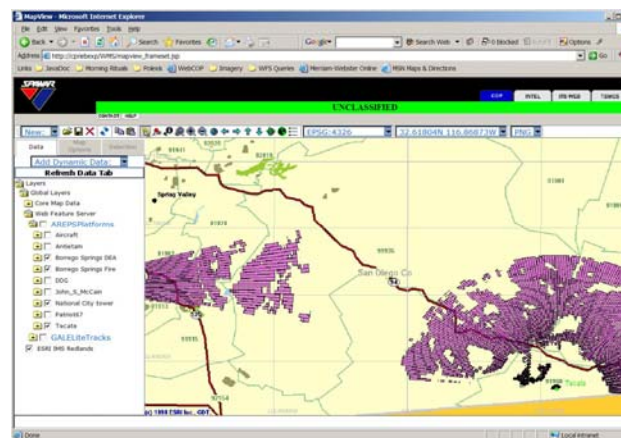
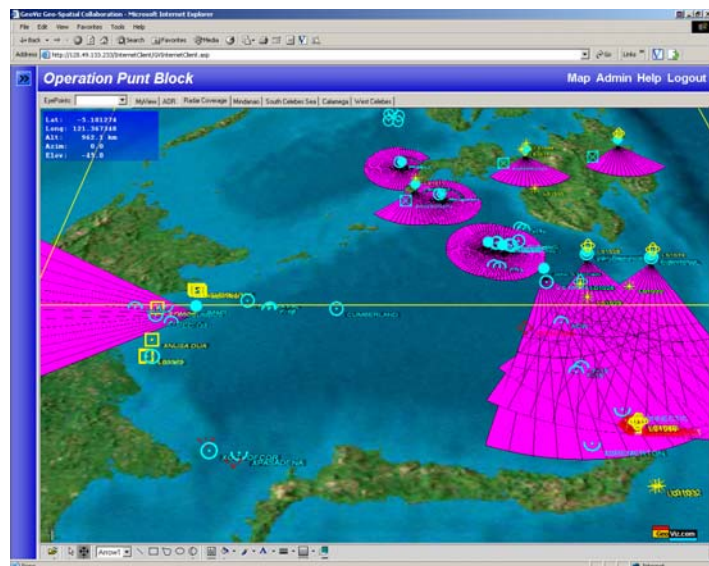
Composable ForceNet

(Current Installs)

- CTF-74
- CTF-72
- CTF-72.2
- USS Blue Ridge

1. Runs on a background server
2. Uses COAMPS grid data from DAMPS
3. No AREPS operator intervention
4. Accessed via application GUI

Homeland Defense Proposal effort
(SSC 246 Command and Control
Technology and Experimentation
Division)



Emergency Response UHF communications
East County San Diego

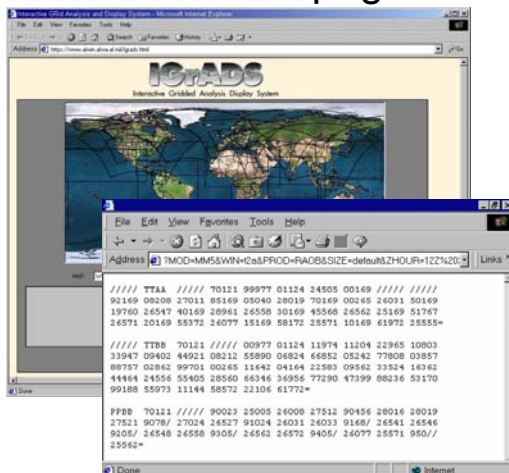


SPAWAR
Systems Center
San Diego

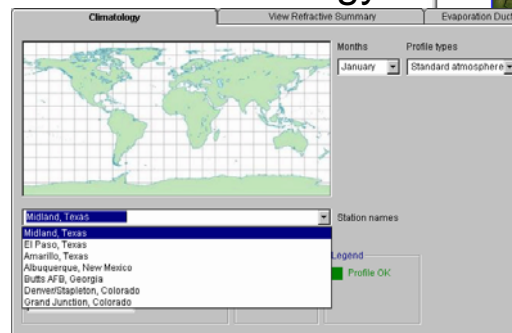
Numerous Environment Data Sources

- WMO Code
- Climatology
- Metcast/JMV
- Custom Columns
- TEDS
- COAMPS / MM5

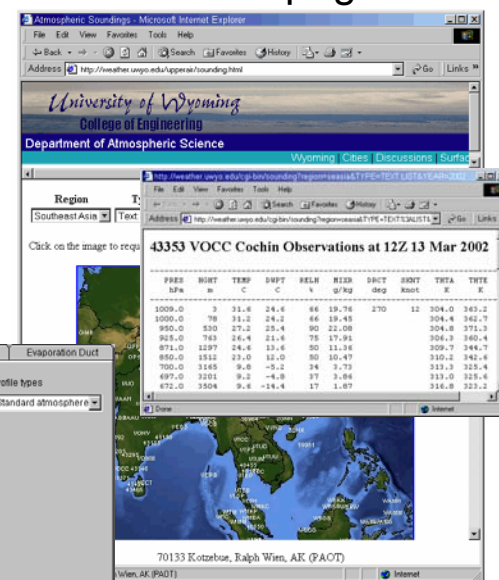
JAAWIN Homepage



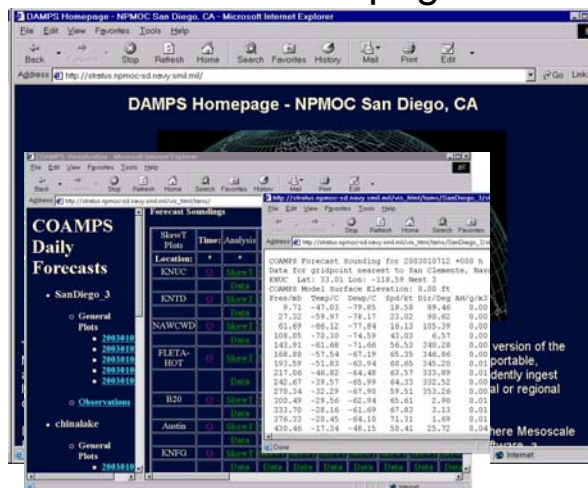
Climatology



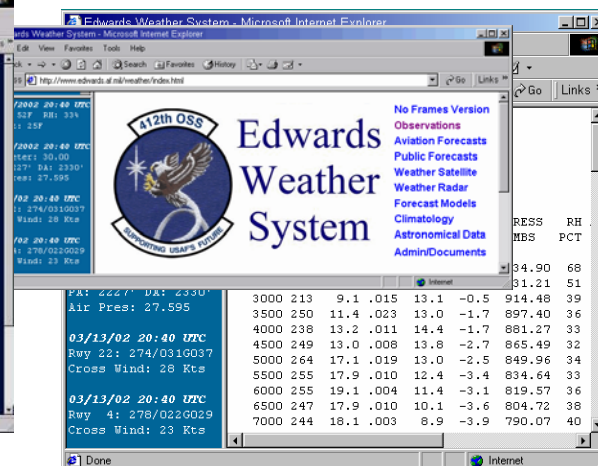
Civilian Homepages



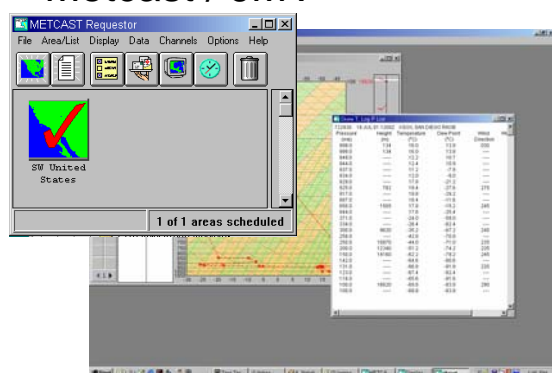
DAMPS Homepage



DoD Homepages



Metcast / JMV





Special Application AREPS FalconView Interface

Multiple emitters

AREPS Project FalconView

System Legend
Radar in database Radar not in database Not Assessable by AREPS Error

Apply columns
☒ Yes
☐ No

Platform	Radar	Lat (Deg)	Lon (Deg)	Ant Ht (ft) AGL	Target	1st Bng (°T)
<input checked="" type="checkbox"/> Coastal Survey Emitter 4		36°33'01.8"N	121°56'23.6"W	80	Small boat	180
<input checked="" type="checkbox"/> Coastal Survey Emitter 1		34°31'20.1"N	120°29'53.7"W	40	Small boat	300
<input checked="" type="checkbox"/> Coastal Survey Emitter 3		32°43'50.3"N	117°13'01.2"W	60	Small boat	120
<input checked="" type="checkbox"/> Coastal Survey Emitter 2		33°45'54.2"N	118°18'17.5"W	100	Small boat	145

Environment
☒ Use AREPS environment file
sample_surface du AREPS environment files
☐ Use COAMPS environment file
Browse for a COAMPS environment file
COAMPS forecast times
<Use DTED> Terrain
0. Sea-surface wind speed (kts)

Electronic Order of Battle

☒ Display emitters on FalconView map
☒ Show emitter names

Display Parameters
100. Max
20000. Max
50 Elev
95 Probability of detection (%)
[4] Emitters (34°31' Coverage display
Save files

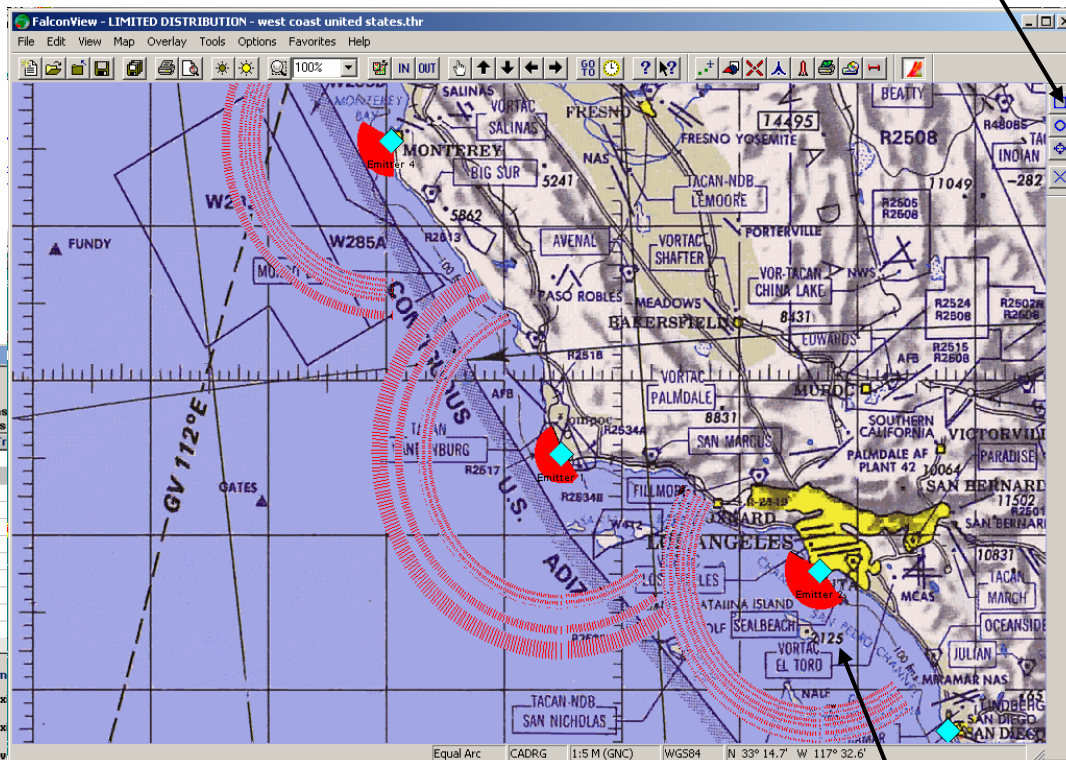
Range & bearing
environment data

DTED
terrain

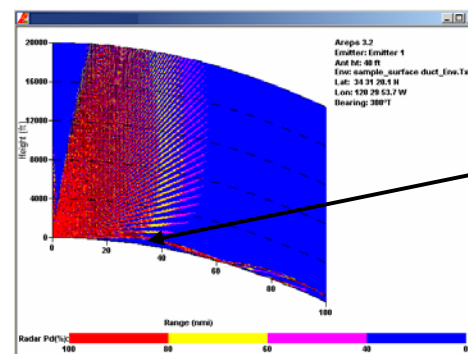
Import various
EOB files

All normal
AREPS
displays

FalconView display

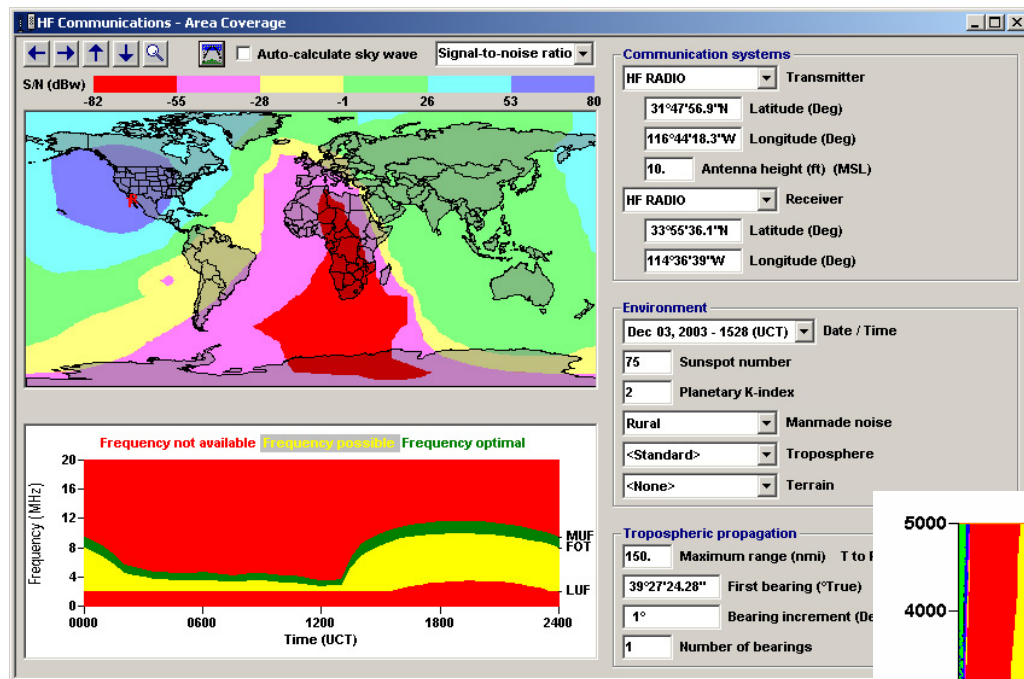


AREPS toolbar



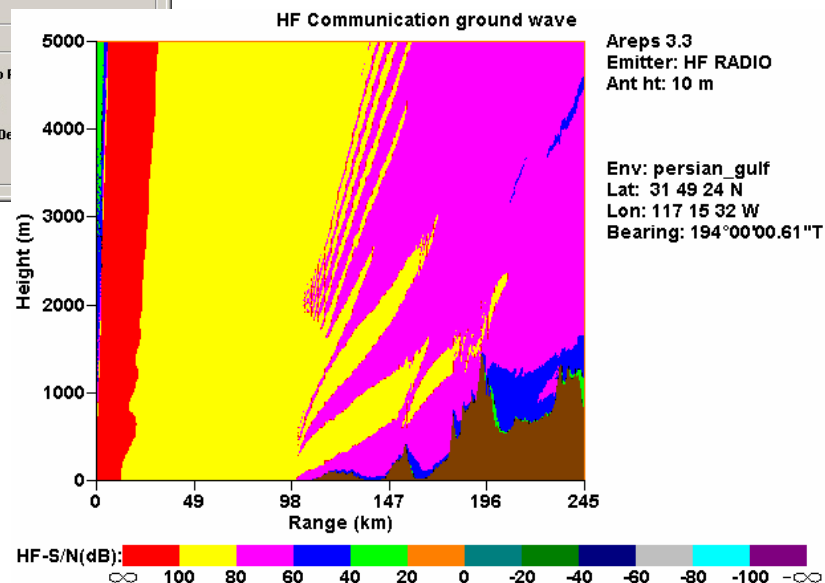
Surface-based
duct skip-zone

HF communications



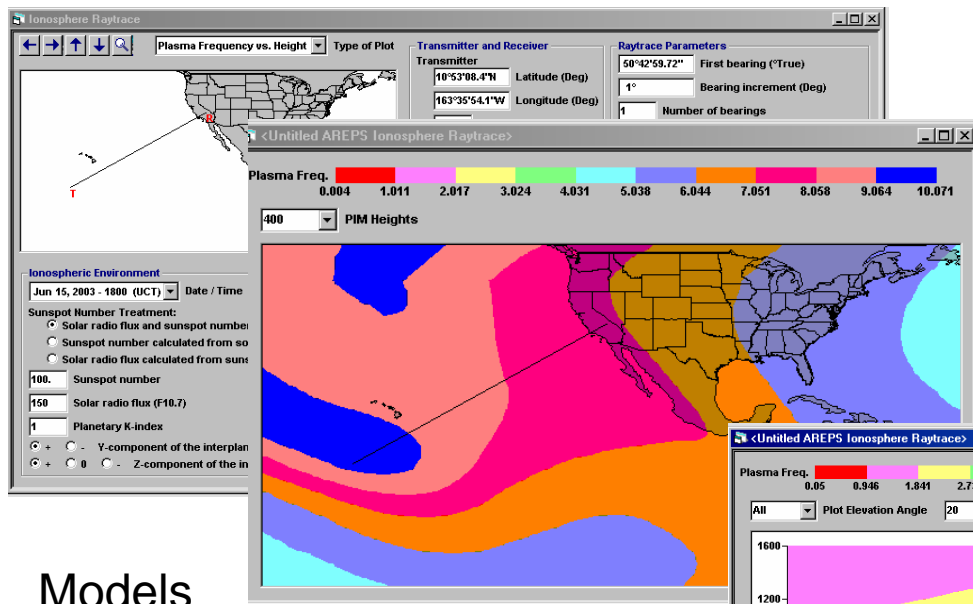
- Reads environment from a file created with the environment program and ionospheric data obtained via AREPS homepage.
- Reads terrain from DTED or a custom file.

- Used to assess HF sky-wave in both area and point-to-point display
- Used to assess HF combined sky-wave and ground-wave
- Propagation loss, electric field, signal-to-noise, received power, MUF, LUF, FOT, terrain masking.



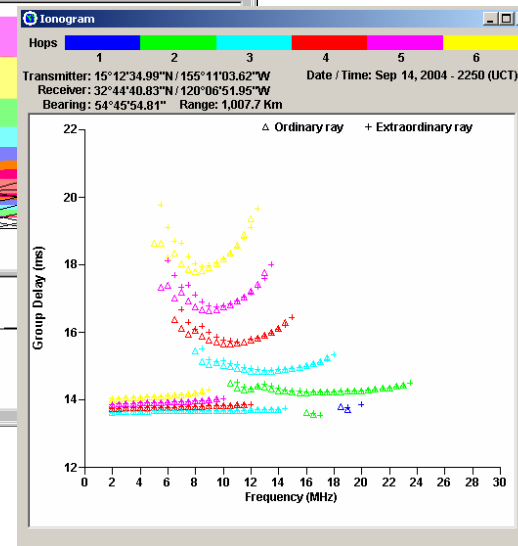
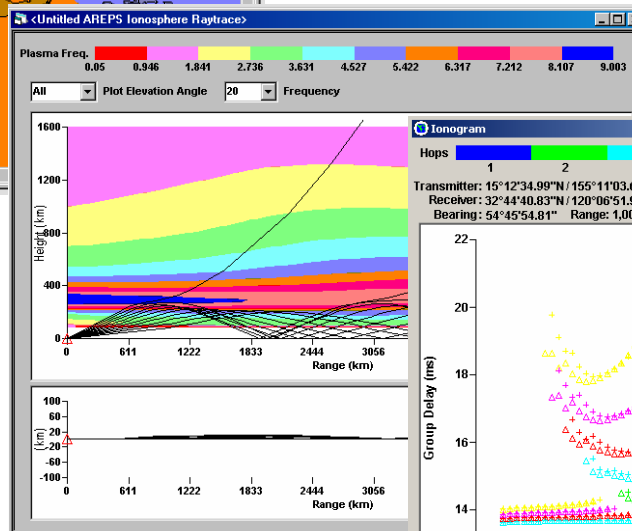
HF Ionosphere Raytrace Communications & Radar

- Multiple azimuths, elevations, and frequencies
- Ray display - elevation and azimuth
- Plasma frequency contours in vertical and horizontal planes
- Contours of F2 and E region critical parameters
- Frequency homing
- Ionogram

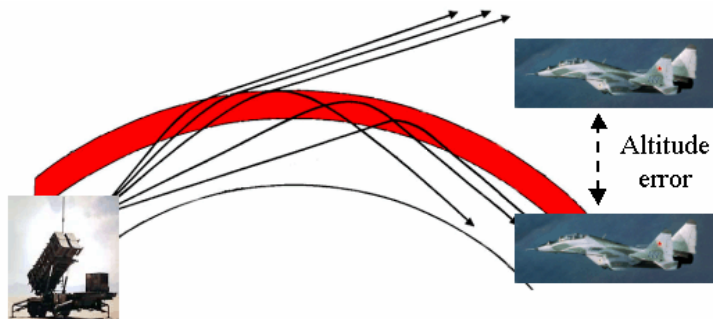
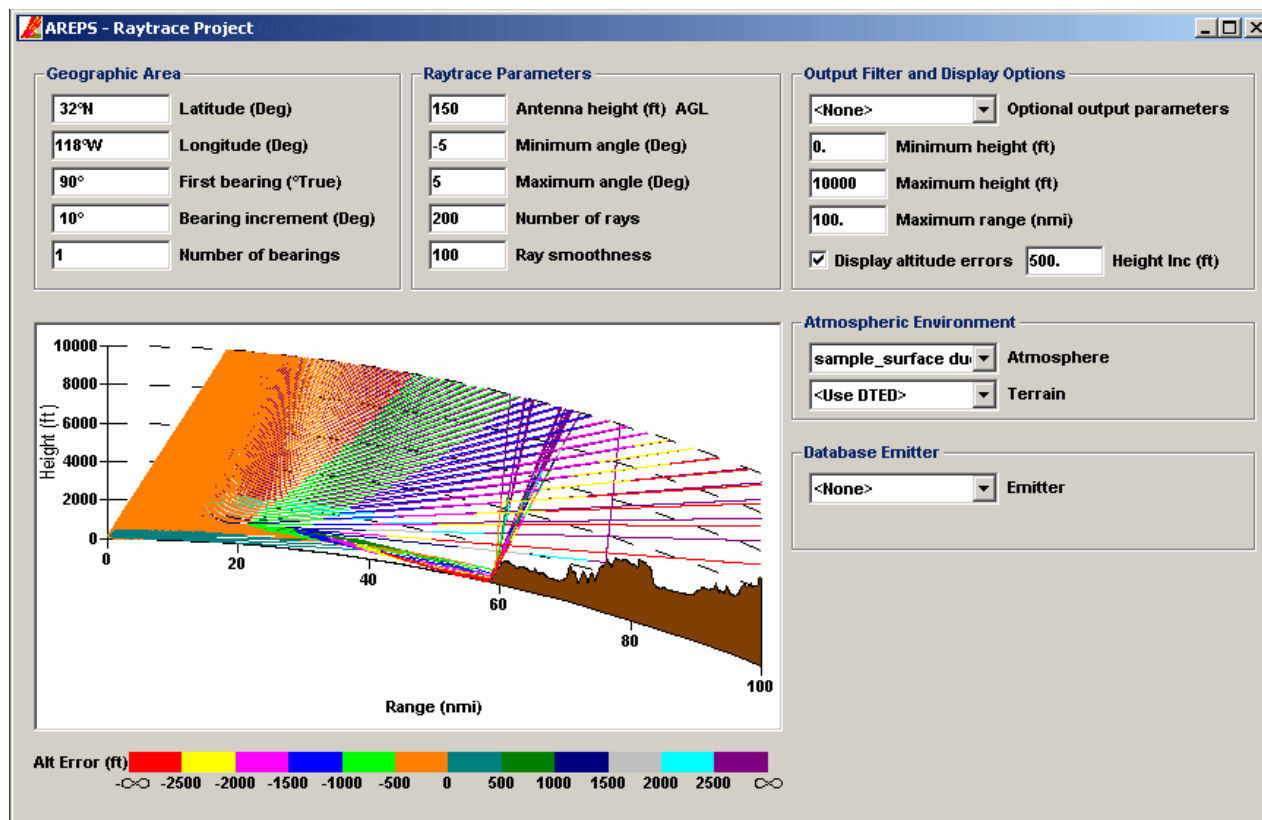


Models

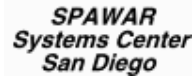
- Jones-Stephenson 3-D ionosphere with geo-magnetic field
- Parameterized Ionosphere Model (PIM 1.7)
- Future International Reference Ionosphere User plug-ins



Troposphere Raytrace



- DTED data
- Altitude errors
- Range / bearing dependent atmosphere
- Optional internal data output - angles, ranges, heights, times, etc.

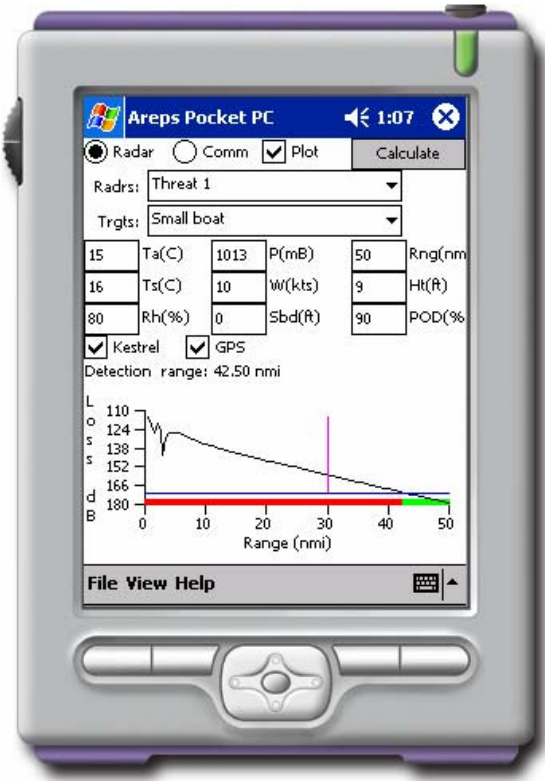


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Systems Center
San Diego

Special Application - AREPS Pocket PC

Objective:

Provide an electro-magnetic detection / counter detection capability in a small but robust hardware suite that will utilize real-time data such as wind, temperature, humidity and sea-surface temperature



Result:

- Radar probability of detection
- UHF/VHF communication assessment
- Standard (Ffactor) propagation model
- Naval Postgraduate School evaporation duct model
- Specification of surface-based duct
- Full AREPS EM system database
- Plug-in Kestrel weather sensor for automatic updates of surface environment conditions
- Plug-in GPS receiver to indicate current distance from emitter.
- On-line (html format) help



Kestrel
Weather
Sensor